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The achievement gap in Indonesia? Organizational and ideological differences between private Islamic schools

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ABSTRACT

This study examines the effects of different types of private Islamic schools on student achievement and achievement gaps. We formulate hypotheses, drawing on an education production function approach that outlines differences in investment and resource allocation decisions across these tracks and streams. We tested our hypotheses using Indonesian data collected in 2013 on 156,952 students nested in 3,150 schools in 366 municipalities. Using multilevel regression analyses, we found that student achievement and achievement gaps vary over private Islamic school tracks and streams. Even though student achievement and achievement gaps are strongly determined by student and family characteristics, our findings suggest that differences between school tracks and streams also play an important role. Moreover, our study revealed a large variability in student achievement and achievement gaps between municipalities.

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Organizational track; ideological stream; achievement gap; Indonesia

Introduction

The number of private secondary schools in Indonesia is growing. Almost 60% of Indonesian secondary schools are private in nature, as are more than half of junior secondary schools and almost 70% of senior secondary schools (Bappenas [Ministry of National Development Planning], 2015). Private secondary schools are thus becoming more important education service providers than public schools in Indonesia because they educate a large number of students, especially in rural and remote areas.

Within the group of private secondary schools, more than 90% are Islamic in nature, meaning that there is explicit attention to the spirit of Islam in the curriculum (calculated from the Ministry of Education and Culture [MoEC], 2013). In Indonesia, Islamic schools emerged in the 13th century when Islam spread through merchant activities of Arab Muslim traders (Azra, 2014). Therefore, the Islamic school tradition is strongly rooted in Indonesia. In addition, Catholic and Protestant schools are also popular in Indonesia. Private Islamic schools are argued to be popular because they are less expensive and

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have a higher level of religious instruction than public schools (M. Woodward, Rohmaniyah, Amin, & Coleman, 2010). This is illustrated by the fact that in Indonesia the number of private madrasah schools (a particular kind of private Islamic school) annually increases by an average of 3.9% while the average growth of public schools is only 1.5% (Power, 2006). A madrasah is a traditional religious school that offers students broad general subjects with different levels of graded instruction and structured assessments (Tan, 2014). Madrasahs (meaning "school" in Arabic) can be found in almost all Muslim-populated countries around the globe, like Turkey, Thailand, Malaysia, Bangladesh, India, Pakistan, and Egypt. Madrasahs differ from general schools in that they teach several religious subjects, including the Quran and the Prophet's Tradition, Theology and Ethics, Islamic Law, Islamic History and Civilization, and the Arabic Language. In contrast, general schools only teach religious education (Daulay, 2001).

However, students' achievement in Indonesian private schools is lower than students' achievement in public schools. For example, Newhouse and Beegle (2006) examined the impact of school type on the academic achievement of junior secondary school students in Indonesia. After controlling for a variety of other characteristics, the conclusion was that private school students' scores in the national exam were 0.15 to 0.3 standard deviations lower than those of their comparable public-school peers. These lower students' scores are puzzling as well as challenging because of their potential negative impact on student achievement in general.

Studies on differences in student achievement focus predominantly on the difference between public and private schools (e.g., Bernardo, Ganotice, & King, 2015; Braun, Jenkins, & Grigg, 2006). Interestingly, there is little attention to differences *between* private schools in general, and between Islamic private schools in particular, even though these differences are quite pronounced and might matter for explaining differences in student achievement, as we will later argue. This study therefore asks whether and how differences between private Islamic schools in Indonesia affect student achievement as well as achievement gaps for boys and girls, and for groups of different socioeconomic status (SES).

Though inequalities have decreased during the past years, the achievement gap across SES and gender in Indonesia is still large (Tobias, Wales, Syamsulhakim, & Suharti, 2014; World Bank, 2013). Our study defines the achievement gap as: the observed differences in student achievement, measured by cognitive test scores between groups of students, especially groups defined by SES and gender (Kafer, 2007; Reardon, 2011). Seminal studies examined achievement gaps across SES and gender, also in the Indonesian context. For instance, high SES is linked to higher student achievement (Suharti, 2013). According to the Organisation for Economic Co-operation and Development (OECD) international benchmark with a 1000-point scale, the average scores of students from families in the bottom income quintile are 350 in mathematics and 400 in reading (Tobias et al., 2014; World Bank, 2013), whereas average scores of their peers in the top income quintile are 390 and 420, respectively (Tobias et al., 2014). Interestingly, in Indonesia, girls perform better than boys in all subjects (Suharti, 2013; Suryadarma, 2010). However, there is no study that examines the possible effects of differences between various types of Islamic private schools on student achievement and the student achievement gaps across SES and gender in Indonesia. SES is a crucial factor in understanding student achievement in Indonesia (Suharti, 2013), whereas gender inequality in education is a critical issue in Muslim majority communities (McDonnell, 2017). Muslim communities have some cultural and

political disadvantages with regard to gender equality (Inglehart & Norris 2009). Countries with a Muslim majority often use a dual legal system, based on civil law and Islamic religious law (family law). The latter often contains obstacles to women's equality (Offenhauer, 2005; Otto, 2010), like fewer rights and more responsibilities for wife (Qibtiyah, 2009).

This paper identifies two key differences in private Islamic schools in Indonesia that might affect student achievement and achievement gaps. First, there are ideological differences relating to how private Islamic education providers interpret their religion in the Indonesian social and educational context. These ideological differences are reflected in three *streams* in Indonesian private Islamic schools, which we will elaborate in the remainder of this paper: traditionalists, modernists, and integrationists (Bryner, 2013; Hassan, 2009; Ishomuddin, 2014). Second, there are organizational differences related to the role of the government in managing private Islamic schools. Here, the distinction between madrasah and non-madrasah is relevant, resulting in two *tracks* in private Islamic schools. Non-madrasah private Islamic schools are coordinated by the Ministry of Education and Culture (MoEC), whereas madrasah private Islamic schools are managed by the Ministry of Religious Affairs (MoRA). On the basis of the above two distinctions, this paper identifies six types of private Islamic schools: (1) traditional madrasah, (2) traditional non-madrasah, (3) modernist madrasah, (4) modernist non-madrasah, (5) integrationist madrasah, and (6) integrationist non-madrasah. More specifically, this paper addresses the question: *How do various tracks and streams in Indonesian Islamic private schools affect students' academic achievements and achievement gaps across gender and parental SES?*

We base the answer to our research question on an education production function approach, which assumes that student achievement is a function of a school's investment in teaching-related activities and resources (Bowles, 1970; Coates, 2003; Hanushek, 2008). Hence, the amount of time, money, and attention devoted to students will affect how much they learn, as well as their performance and the gaps in their achievements. Using this point of departure, we reason that the above-mentioned ideological and organizational differences between Islamic private schools have consequences for investment and resource allocation decisions within the six different types of schools.

We specify our theoretical expectations by distinguishing four dimensions of investments: (1) investments in the primary process, such as the amount of time spent on teaching and the amount of emphasis on particular subjects; (2) investments in teachers, including selection of high-quality teachers and improving teachers by training; (3) investments in students by financially supporting poorer students and implementing single-sex classrooms; and (4) investments in organization and coordination. We categorize the six types of private Islamic schools with regard to these investment dimensions and analyze which school type makes most investments and thus can be expected to have better student achievements and smaller achievement gaps. Multilevel regression analyses (e.g., Snijders & Bosker, 2012) are used to test to what degree the six types of private Islamic schools, and the associated differences in investments and resource allocation decisions, affect student achievement and the achievement gap in Indonesia. We focus on junior secondary schools (JSS) in 2013 for three reasons: (1) JSS are part of Indonesia's compulsory education, which is a national education priority for several decades. (2) Whereas the Senior Secondary School (SSS) exams differ between vocational and general schools, no such distinction exists for JSS exams, which consist of math,

science, English, and Indonesian. This allows us to compare JSS madrasah and JSS non-madrasah. (3) The JSS exam is held for students in Grade 9. Their average age is 15 years, which is similar to student age in the international test of the Programme for International Student Assessment (PISA).

Our study enriches the current literature in at least three respects. First, this is to our knowledge the first quantitative study that systematically compares differences *within* the Islamic private school sector in Indonesia, the country with the highest Muslim population in the world. Whereas several systematic reviews on track and stream differences between private Islamic schools in Indonesia have been undertaken (see, e.g., Barton, 2014; Hassan, 2009; Ishommudin, 2014), none directly tested the relation between these differences and student achievement and achievement gaps in terms of gender and parental SES. Second, by testing the education production function construct in relation to track and stream differences between various types of Islamic private schools in Indonesia, we enrich the literature that deals with how investment and resource allocation differences between schools affect student achievement. Third, by offering a more fine-grained understanding of the effect of organizational and ideological differences in private Islamic schools, this study may contribute to the development of policy recommendations aimed at strengthening the Indonesian national education system (Kingham & Parsons, 2013).

Organizational and ideological differences in private Islamic schools

The school system in Indonesia consists of 9 years of compulsory basic education, combining 6 years of primary school (Grades 1–6) and 3 years of junior secondary school (Grades 7–9). After completing their basic education, students follow 3 years of senior secondary school (Grades 10–12).

As stated previously, schools in Indonesia are either private or public. Within the private education sector, most schools are Islamic. Islamic private schools can be under management of the MoRA or the MoEC, resulting in two possible private Islamic school tracks: *madrasah versus non-madrasah*. Next to this organizational difference, private Islamic schools also differ ideologically. This is reflected in the presence of three streams in private Islamic education, which are coordinated and run by three large non-governmental Muslim organizations that play an important role in the delivery of educational services: a modernist stream, a traditionalist stream, and an integrationist stream (Hasan, 2009).

The *modernist* stream is run by Muhammadiyah, Indonesia's oldest Muslim mass organization. It was established in Yogyakarta in 1912 based on the principles of modernist and moderate Islam (Suharto, 2014). It is called *modernist* because it rejects local customs (tradition) in favor of the universal practices of modern Islam (Palmier, 1954). For instance, it initially established modern schools replicating Dutch schools by implementing graded classes with a curriculum of secular subjects by including religious education (Burhani, 2005). Currently, it is the largest private education provider, running 4,623 preschools and 5,691 educational institutions from primary to higher education, including 1,600 junior secondary schools.[1]

The *traditionalist* stream, called *Nahdatul Ulama* (NU), which means the awakening of Islamic scholars, has played a significant role in the provision of education in Indonesia since the late colonial era. NU is the largest Muslim mass organization in the country

and was established in Surabaya on 31 January 1926. It is called *traditionalist* because it emphasizes the traditional meaning of Islam in the Indonesian context and transfers and internalizes these traditions in education. It manages and coordinates about 6,000 educational institutions from preschools to universities and colleges with 1,700 schools at the junior secondary level.[2]

The *integrationist* stream is the third stream. This stream is represented by the network of Integrated Islamic schools (*Jaringan Sekolah Islam Terpadu*, JSIT), a fairly new consortium that was established in Yogyakarta on 31 July 2003. Integrationist schools offer an integrated secular curriculum within an Islamic moral framework (Bryner, 2013). They integrate general and religious subjects by incorporating religious values in almost all subjects. Currently, the JSIT consortium includes 2,418 member schools together with more than 500 schools at the junior level.[3]

Whereas the modernist movement is primarily a social welfare organization devoted to serving the community in education and healthcare and is characterized by egalitarian and non-hierarchical relations (Pohl, 2012; Thachil, 2014), the traditionalists are dedicated to protecting the interests of clerical elites (Millie, 2013; Thachil, 2014). New comers, the integrationists, resemble the traditionalists with their focus on clerical elites; however, this is combined with a modern agenda that is slightly similar to that of the modernist movement (Hasan, 2009). Like modernists, integrationists favor the universal practices of modern Islam, but they transfer and internalize them in the traditionalist manner. For instance, whereas modernists mostly adopted the Dutch (general) school system, integrationists combined the general school with the Islamic school system, such as the *madrasah*. Although these ideological streams are unique to the Indonesian context, similar ideological streams exist in other Muslim-majority countries, for example in Turkey (Barton, 2014; Buehler, 2009).

Theory

In order to answer the research question of how the various private Islamic school tracks and streams affect student achievements and achievement gaps, we use an input-based or "production function" approach. This assumes that student achievement is a function of the school's investments in activities and resources related to teaching, like time for instruction (Hanushek, 2008): The higher these investments, the more students will learn, and the better they will perform (Coates, 2003). Our study uses the typology of school tracks and streams to assess variations in such investments, and relates them to achievement of individual students as output (Bowles, 1970; Hanushek, 2008).

Hanushek (2008) distinguished two inputs that significantly contribute to student achievement: investments directly controlled by policymakers, such as teachers, and inputs not controlled by policymakers, such as those provided by families (e.g., parental education and income). Most research focuses on inputs like school resources, such as the effects of teacher qualification and experience, or financial resources, on student achievement (Hanushek, 2008).

Next to schools and families, there is another level of input. These are investments that are partly determined by the individual schools but also by the streams, as represented by the three Muslim umbrella organizations. This includes, for example, the choice of whether

to have boys and girls together in the classroom, or decisions about how much time is spent on religious education next to the examination subjects. Beside the stream, schools also are divided by two tracks, madrasah versus non-madrasah. This track relates to government policy, which also influences the schools' investment and in turn affects student achievement. For instance, in the US, the way state governments provide sources of funding and regulate rules for certification affects student achievement (Hanushek, 2008). Likewise, the central and local governments in Indonesia play a very crucial role in educational policy and practice.

Our main argument is that tracks and streams of Indonesian private Islamic schools differ in their decisions with regard to these four types of investment as will be elaborated in the next sections. With regard to track differences, we argue amongst others that private madrasah schools in Indonesia – as compared to private non-madrasah schools – devote fewer hours to teaching on the national curriculum, invest less in teachers and students, have lower quality of teachers, and receive fewer parental monetary contributions. With regard to stream differences, we argue that integrationist schools invest more time in teaching the national curriculum, have better quality teachers, and mostly have single-sex classrooms. Modernist schools serve poorer students and devote more time to coordination. Traditionalist schools invest more time in teaching the national curriculum than modernist schools, but traditionalist schools invest less in coordination and the quality of teachers. Figure 1 summarizes the characteristics of the three streams. Consequently, we expect that they also are the primary factor explaining between-school variations in student achievement and gender and SES achievement gaps.

School track differences and student achievement

Looking at *investments in the primary process*, all Islamic private schools, both madrasahs and non-madrasahs, follow the national curriculum. However, according to *Surat Keputusan Bersama (SKB) Tiga Menteri No. 6/1975* (the joint decree of three ministries: Ministry of Religious Affairs, Ministry of Education and Culture, Ministry of Home Affairs), madrasahs teach a core curriculum of general subjects supplemented by an additional 30% of

Streams ▼	Characteristics	
Traditionalist	A. Teaching time	30 hours per week
	B. Salience of NE	*No particular focus on certain subjects*
	C. Ownership	Individual
	D. Coordination	*Least coordinated*
Modernist	A. Teaching time	30 hours per week
	B. Salience of NE	*No particular focus on certain subjects*
	C. Ownership	Organization
	D. Coordination	*Most coordinated*
Integrationist	A. Teaching time	40 hours per week
	B. Salient of NE	*Particular focus on Science, Math, English*
	C. Ownership	Individual/group
	D. Coordination	*Moderately coordinated*

Figure 1. The different characteristics of school stream.

Note: NE, national examination.

religious education subjects and Arabic language. In non-madrasah schools, there is less attention to religious education subjects. Consequently, students in non-madrasah schools spend more time on national examination subjects (math, science, English, Indonesian). More teaching significantly enhances student performance (Stinebrickner & Stinebrickner, 2008), especially in mathematics and science (Grave, 2010). Consequently, we expect student achievement (in math, science, and English) in madrasahs to be lower than in non-madrasahs.

In terms of *investments in teachers*, the MoEC, as well as local governments, facilitate both public and private non-madrasah teachers to enhance their professional skills and qualifications (Power, 2006). The Ministry of Religious Affairs (MoRA) fully supports public madrasah schools, but does not provide as much funding and training for private madrasahs (Kingham & Parsons, 2013).

Moreover, Law 14/2005 concerning Teachers and University Lecturers states that all teachers at the junior secondary level must have a 4-year post-secondary diploma or a bachelor's degree in the relevant subject. The fulfillment of this teachers' qualification in non-madrasah schools is higher, with 61% as compared with 55% of teachers meeting this qualification in madrasahs; this means that almost 45% of madrasah teachers do not have a 4-year post-secondary diploma (MoEC, 2010). Teacher development and qualification may influence subject-matter knowledge and pedagogical skills, which in turn may bolster or undermine teacher performance and student achievement (Darling-Hammond, 2000; Maulana, Helms-Lorenz, & Van de Grift, 2015). Consequently, lower teacher qualifications are assumed to be related to lower teacher performance and lower quality of learning in madrasahs (Kingham & Parsons, 2013).

Concerning *investments in students*, private Islamic madrasahs invest less in their students than private Islamic non-madrasahs, with an average annual cost per pupil of IDR 9,706,000 (US$970,6) compared to IDR 10,930,000 (US$1,093) in their non-madrasah counterparts. In addition, parents of students in Islamic private non-madrasah schools contribute a higher proportion to learning budgets than their counterparts in madrasahs (Power, 2006). The more money a school has, the better the teaching can be, and the better the achievement (Hanushek & Raymond, 2005).

In terms of *investments in organization and coordination*, while madrasahs are centrally managed by the MoRA, non-madrasahs are decentralized from the MoEC to the municipalities (Permani, 2009). This means that non-madrasahs are able to focus more on local conditions and government arrangements, whereas madrasahs also need to coordinate with the central government. Such coordination may divert money to bureaucracy, decreasing a school's investment in teaching, which in turn may negatively affect student performance (Ghozali, Mudjahid, & Hayati, 2013). Conversely, decentralization has a positive impact on teachers' working environments because it enables teachers to connect and share their motivation and skills (Louis, Dretzke, & Wahlstrom, 2010). Competent and motivated teachers improve the quality of teaching and learning and thus advance student achievement (Darling-Hammond, 2000). Therefore, we expect the centralized system of madrasahs to have a negative impact on student achievement.

Overall, due to their focus on religious subjects, private madrasah schools in Indonesia – as compared to private non-madrasah schools – devote fewer hours to teaching on the national curriculum. Furthermore, investments in teachers and students and the quality of teachers are lower. Madrasahs also receive fewer parental monetary contributions

and need to divert resources into coordination tasks. All these factors are expected to affect students' learning and achievement. On the basis of these arguments, we expect that *students who attend private madrasah schools will have a lower level of achievement in the National Exam subjects than students who attend private non-madrasah* schools (H1).

School stream differences and student achievement

With regard to *investments in the primary process*, the integrationists teach more hours, with 35 hr a week, compared to the traditionalists and the modernists, who each teach 30 hr. Teaching time is more productive than time spent on self-study (Dolton, Marcenaro, & Navarro, 2003), and more teaching time has been found to improve students' performance (Stinebrickner & Stinebrickner, 2008), particularly in mathematics and science (Grave, 2010).

In terms of general subjects and time devoted to teaching, integrationist schools are similar to general public schools. However, they also teach additional religious subjects as an extracurricular activity, like madrasahs. In addition, the integrationists pay extra attention to the national exam subjects, especially to English, mathematics, and science, whereas the traditionalists and the modernists do not (Hasan, 2009). This extra attention to national exam subjects helps to advance the understanding of the students in those specific subjects to be tested. This can be expected to lead to an increase in their test scores.

In terms of *investments in teachers*, as mentioned above, the law requires that all teachers at the junior secondary level must have a 4-year post-secondary diploma or a bachelor's degree in the relevant subject. Fulfillment of this qualification in the integrationist stream is higher (76%) than in the traditionalist (71%) and modernist (70%) schools (MoEC, 2010), resulting in slight variations in knowledge and pedagogical skills, which might contribute to the variation in achievements across streams (Darling-Hammond, 2000).

Likewise, in the integrationist stream school personnel and teachers spend more time mainly to implement the full-day school system. This means that schools have to pay additional salary for overtime teaching by their teachers, leading to a general increase in school costs. Because private school operation costs rely mainly on parental contributions, they increase school fees to cover their operational costs (Power, 2006). For instance, the average integrationist tuition fee is IDR 1,973 ($197) per student per year, whereas the average tuition fee in the modernist and traditionalist streams is IDR 983 ($98) and IDR 676 ($67), respectively (calculated from MoEC, 2010). These additional investments in teaching time may improve student achievement (Hanushek, 2006).

Overall, the integrationist schools devote more teaching time and provide extra attention to national exam subjects. Additionally, they also invest more in teachers' development and qualification, and have greater budgets for teaching. These arguments lead us to predict that *students in integrationist streams will attain higher academic achievement than those in modernist and traditionalist streams* (H2).

The gender achievement gap across school tracks and streams

Gender differences in student achievement have been subject of extensive study and debate (Machin & Pekkarinen, 2008; Stoet & Geary, 2013; Suryadarma, 2010). There are findings from empirical studies that girls are superior in reading skills but inferior in mathematics skills. Findings from the United States on eighth graders, for instance, confirm that

girls consistently had lower mathematics scores but higher scores in reading (Machin & Pekkarinen, 2008; Stoet & Geary, 2013). Similarly, a cross-country study in 2003 using data from PISA among 15-year-old students showed that girls performed better in reading while boys performed better in mathematics (Machin & Pekkarinen, 2008). Findings from Indonesia reveal that girls perform better than boys in numeracy (Suryadarma, 2010). Suryadarma (2010) argues that girls' superiority in numeracy can be explained because there is a higher labor market return for female-led families to invest more resources in girls.

In relation to the gender achievement gap, an important difference between the various types of private Islamic schools is the choice to implement single-sex education (SSE). Compared to non-madrasahs, in terms of teaching and learning rules, madrasahs tend to be stricter (K. E. Woodward, 2015). They also have a tradition of single-sex education (SSE), which has been found to make girls freer and more competitive (K. E. Woodward, 2015). The same holds for integrationist schools: They also implement single-sex education, which can minimize distractions and reduce discipline problems (Gurian & Henley, 2001). Although the standards of discipline in a single-sex environment (Jeffrey, Jeffery, & Jeffery, 2008) are similar, girls tend to be more closely supervised than boys (Parker & Raihani, 2009), which may enable girls to focus more on learning than when they are in a mixed class. In addition, single-sex education has been shown to benefit girls because it boosts their self-esteem and confidence (Bracey, 2006), which is linked to educational achievement (Marsh, Byrne, & Yeung, 1999; Piper, 2008).

On the basis of these arguments related to single-sex education, we assume that in the madrasah track and the integrationist stream, girls will perform better than boys, reinforcing the gender achievement gap in both the madrasah track and the integrationist stream, compared to the non-madrasah track, the traditionalist, and the modernist streams. Overall, girls attending madrasah and integrationist schools are expected to profit more from implementation of single-sex education than are boys. In these school types, this is expected to widen the gender gap in favor of the girls. We thus predict that *gender-based achievement gaps in private madrasahs are greater than in private non-madrasahs (H3a) and that gender-based achievement gaps in the integrationist stream are greater than in traditionalist and modernist streams (H3b)*.

The SES achievement gap across school tracks and streams

Unlike madrasahs that are centrally managed by the MoRA, non-madrasahs are decentralized and fall under the MoEC and local governments (Permani, 2009). This has consequences for investments in education, since non-madrasahs have more resources than madrasahs because they receive investments from both the central and local governments.

Since the non-madrasah schools have more resources, they can provide more financial support to low-SES students. For instance, scholarships for low-SES students are more adequate in non-madrasahs than in madrasahs because, as mentioned above, non-madrasahs have at least two sources of resources, namely, the MoEC and the district education office (Power, 2006). Financial support via scholarships for low-SES students could prevent them from leaving school for a temporary job, such as harvesting. This can improve the attendance of low-SES students, which may advance their learning; this would reduce the SES

achievement gap more in non-madrasah schools than in madrasah schools. Moreover, although the MoRA fully supports public madrasahs, it does not provide sufficient scholarships to private madrasahs (Kingham & Parsons, 2013). This could make it difficult for private madrasahs to boost the motivation and opportunity of low-SES students to heighten their achievements. It should be noted that unlike in public madrasahs, students in private madrasahs dominantly come from less educated and poorer families (K. E. Woodward, 2015).

In addition, although there are contradicting opinions as to the effect of decentralization in the education sector (e.g., Devins, 1987), in the Indonesian context decentralization has influenced local governments to respond better to local needs for educational services (Sumarto, Suryahadi, & Arifianto, 2004; United Nations Development Programme, 2002; Usman, 2001). When decentralization leads local governments to respond to the local people's needs and people's aspirations for children's education are high, the municipality may invest more in education. This investment leads to improved learning environments and may equalize the performance of low-SES students in non-madrasahs. Thus, it can lead to improved educational outcomes (Simatupang, 2009).

With regard to financial or other support for low-SES pupils, unlike integrationist schools, traditionalist and modernist schools financially support low-SES students. Both traditionalist and modernist schools collect Islamic alms (*zakat*) and donations from their members (Fauzia, 2017). These financial resources are partly distributed amongst low-SES students. This may increase the daily school attendance of low-SES students and in this way improve their learning and performance, in turn reducing the advantage of the high-SES students over low-SES students, and thus the SES achievement gap in modernist and traditionalist schools becomes smaller.

On the basis of these reasons, we predict that *the SES achievement gap in private madrasahs is greater than in private non-madrasahs (H4a) and the SES achievement gap in the integrationist stream is greater than the gaps in both the traditionalist and modernist streams (H4b)*.

Context variables

In the educational production function approach, family backgrounds are important determinants of student achievements (Grave, 2010). Generally, highly educated parents with certain professional occupations, such as public servants and private workers, are associated with high expectations towards education. These groups of parents have a better capacity to support and motivate their children, which may improve their school performance as compared to peers from low-educated parents with unskilled occupations. Also, in the Indonesian context, parental education and occupation are still determinant factors in student achievement (Suharti, 2013). We therefore include parents' educational background and occupation in our analyses.

Furthermore, as reviewed by Hanushek (2008), school characteristics and municipality factors need to be included as inputs in the education production function. At the school level, this paper takes into account the average school test score, the average student age, the proportion of female students, the school size, and the proportion of parents with a professional occupation and a high educational background. At the municipality level, we also include the average scores on this level, as well as the average of students' age,

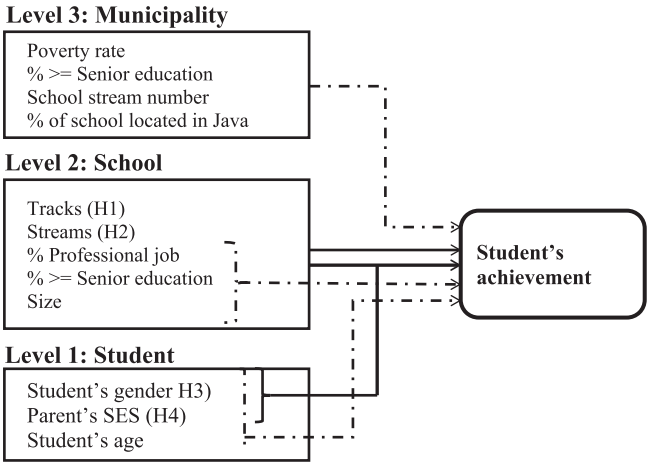

Figure 2. The effect of school stream and track on student achievement and achievement gap.

Note: ***Context variables***: average student age and proportion of females at the school level; and at the municipality level: average student age, average school size, proportion of females, proportion of professional parents.

proportion of females, school size, proportion of parents with a professional occupation and high educational background, poverty rate, and the average number and proportion of schools located on Java Island. Figure 2 illustrates our conceptual framework.

Data and methods

Data collection

We mainly used the National Examination dataset of junior secondary education from the MoEC (2013). It consists of data of 3,671,863 students nested in 48,962 schools, both public and private, and madrasah and non-madrasah. The dataset consists of national examination scores on four subjects: Indonesian language, mathematics, science, and English. Since the variation on the Indonesian language score is low (1.89), this study focuses on mathematics (4.31), science (3.12), and English (2.90).

The dataset also includes student age, gender, and parent's education and occupation for each school. The junior secondary schools in the dataset are divided into three categories: *madrasah tsanawiyah*, junior secondary school, and open junior secondary school, the latter two representing our non-madrasah category. We combined junior secondary school and open junior secondary school into a non-madrasah school category because the numbers of these schools are very small and exist only in the modernist stream.

To categorize the various schools according to the three streams of private Islamic schools, we consulted with and interviewed a number of experts in three rounds, that is, the chairperson or vice chairperson of the modernist, the traditionalist, and the integrationist umbrella organizations. First, on the basis of an initial consultation and interview, we selected data from all private non-madrasahs as well as madrasahs from the MoEC dataset and coded "1" for *traditionalist*, "2" for *modernist*, "3" for *integrationist*, and "4 for other, which could be traditionalist, modernist, or integrationist if the identity could not be verified. This category consists of 39.4% of all schools in the dataset (16,436).

Second, using the selected data of the three streams of Islamic schools, we again consulted the chairperson or vice chairperson of each umbrella organization. They partially confirmed the first school list and provided an additional school list. On the basis of this data confirmation, we included additional school information calculated from *Data Pokok Pendidikan* (education principal data; MoEC, 2010) and linked this to the MoEC National Exam dataset 2013. Finally, we sent the new selected school data to the chair or vice chair of the organizations for a final reliability check.

The modernist and traditionalist informants confirmed that the new school data sets were correct, but the integrationist informant proposed dropping some madrasahs in the dataset because they were not part of the integrationist madrasahs. On the basis of this confirmation, we constructed the final dataset consisting of 156,952 students nested in 3,150 schools. Those students are distributed over three school streams: 43.8% (1.380) in *the traditionalist*, 50.4% (1.589) in *the modernist*, and 5.8% (181) in *the integrationist* institutions.

Furthermore, three experts (Vice Chairman of Primary and Secondary Education Council of Muhammadiyah/*modernist*; Vice Chairman of LP Maarif NU/*traditionalist*, and the Chairman of JSIT/integrationist) were approached to elicit background information about each stream's unique features as indicated by their vision and mission and how the schools incorporate the national curriculum, as well as issues such as the number of teaching hours, teacher training, teaching qualification, extra attention for specific subjects, investments in coordination, financial or other support for low-SES pupils, and implementation of single-sex classes.

Data description

The dataset is described in terms of variables and levels (student/family, school, and municipality). Summaries of the variables (means, standard deviations, and proportions) and distributions over the school tracks and streams are given in Table 1, at all three levels; of these, the most important findings are mentioned in the text.

Variables

Student/family

National examination (NE) scores. NE results on mathematics, science, and English are scored from 0 to 10.

Age in years. Students are mostly 15 years old when taking the exams, with ages ranging from 14 to 28. We use centered age for the analysis, meaning that a value within the age is equal to zero.

Parental education. Five categories are distinguished: "1" for primary education or lower (34.4%), "2" for junior secondary education (16.1%), "3" for senior secondary education (17.5%), and "4" for higher education (6.8%). If parental educational level was unknown, it was coded "0".

Table 1. Descriptive statistics for student-, school-, and municipality-level variables.

		Traditionalist		Modernist		Integrationist	
Variables	Overall	Madrasah	School	Madrasah	School	Madrasah	School
Student level (*N* = 156,952)	μ (*SD*)	*n* = 50,618 (32.3%)	*n* = 23,540 (15%)	*n* = 18,188 (11.6%)	*n* = 55,547 (35.4%)	*n* = 375 (.2%)	*n* = 8,684 (5.5%)
1. Math score	5.55 (2.12)	5.74 (2.06)	5.66 (2.21)	5.39 (2.07)	5.28 (2.09)	6.34 (2.05)	6.26 (2.17)
2. Science score	5.79 (1.83)	5.95 (1.82)	5.93 (1.99)	5.67 (1.74)	5.53 (1.78)	6.20 (1.45)	6.31 (1.67)
3. English score	5.45 (1.70)	5.52 (1.65)	5.46 (1.76)	5.31 (1.63)	5.28 (1.68)	6.39 (1.44)	6.36 (1.71)
4. Student age	15.56 (0.85)	15.58 (0.84)	15.63 (0.86)	15.57 (0.87)	15.55 (0.86)	15.17 (0.57)	15.23 (0.62)
5. Student gender *(1 = female)*		.51	.47	.50	.46	.45	.49
6. Parent education:							
(0) Unknown	25.20%	27.7%	18.4%	22.7%	26.6%	7.2%	25.8%
(1) Primary or below	34.40%	43.6%	44.1%	36.8%	25.6%	1.1%	6.8%
(2) Junior secondary	16.10%	15.5%	17.0%	18.6%	17.0%	1.6%	7.2%
(3) Senior secondary	17.50%	10.9%	16.2%	17.0%	23.0%	22.4%	25.4%
(4) Higher education	6.80%	2.3%	4.2%	4.8%	7.7%	67.7%	34.7%
7. Parent job:							
(0) Unknown	23.00%	25.1%	16.0%	21.4%	24.7%	4.8%	23.0%
(1) Farmer/worker	36.10%	41.3%	39.8%	43.8%	31.0%	.3%	12.9%
(2) Civil servant/professional	5.30%	3.2%	3.4%	5.4%	5.7%	40.0%	17.4%
(3) Private workers	12.00%	9.4%	13.9%	7.5%	13.1%	21.3%	23.4%
(4) Self-employed	17.50%	15.1%	19.8%	15.6%	19.1%	25.6%	18.5%
(5) Other	6.20%	5.8%	7.1%	6.2%	6.4%	8.0%	4.8%
School level (*N* = 3,150)	range	*n* = 924 (29.3%)	*n* = 456 (14.5%)	*n* = 502 (15.9%)	*n* = 1,087 (34.5%)	*n* = 3 (0.1%)	*n* = 178 (5.7%)
1. Math score average	2.33–9.90	5.90 (1.65)	5.90 (1.83)	5.53 (1.71)	5.28 (.160)	5.68 (1.13)	5.85 (1.45)
2. Science score	3.14–9.63	6.11 (1.44)	6.15 (1.60)	5.79 (1.45)	5.54 (1.36)	5.96 (0.86)	6.03 (1.11)
3. English score	2.71–9.24	5.64 (1.24)	5.63 (1.36)	5.38 (1.27)	5.22 (1.17)	6.15 (1.01)	6.01 (1.12)
4. Proportion of senior + education parents	0–1	0.03 (0.09)	0.03 (0.10)	0.05 (0.12)	0.05 (0.09)	0.41 (0.42)	0.03 (0.09)
5. Proportion of professional parents	0–1	0.12 (0.17)	0.17 (0.21)	0.21 (0.24)	0.26 (0.26)	0.65 (0.56)	0.15 (0.18)
6. Average age	14.0–18.9	15.64 (0.33)	15.73 (0.42)	15.61 (0.37)	15.64 (0.35)	15.24 (0.38)	15.29 (0.32)
7. Proportion of females	0–1	0.49 (0.13)	0.46 (0.14)	0.49 (0.15)	0.45 (0.13)	0.52 (0.09)	0.46 (0.14)
8a. School size	3–476	58.44 (49.56)	55.09 (54.77)	38.62 (28.60)	54.53 (47.52)	133.67 (203.83)	52.01 (46.31)
8b. School size (*categorical*)							
1. Smallest [<20]	20.4%	15.9%	21.1%	24.7%	21.7%	66.7%	20.8%
2. Small [=>20]	27.7%	27.1%	25.9%	36.1%	25.3%	0.0%	28.1%
3. Medium [>36 and <108]	41.4%	44.3%	41.7%	36.1%	41.8%	0.0%	38.8%
4. Large [=>108 and <325]	10.3%	12.7%	10.7%	3.2%	11.1%	0.0%	12.4%
5. Largest [>=325]	.2%	.1%	.7%	0.0%	.1%	33.3%	0.0%

Municipality level (*N* = 366)	range	*n* = 22 (6%)	*n* = 39.1 (10.7%)	*n* = 30 (8.2%)	*n* = 244.9 (66.9%)	*n* = 0 (0%)	*n* = 30 (8.2%)
1. Math score average	3.04–9.78	5.88 (1.45)	5.43 (1.52)	5.48 (1.57)	5.39 (1.52)	5.68 (1.13)	6.00 (1.36)
2. Science score	3.45–8.98	6.00 (1.26)	5.47 (1.37)	5.71 (1.33)	5.58 (1.25)	5.96 (0.86)	6.11 (1.04)
3. English score	3.43–8.54	5.59 (1.12)	5.33 (1.17)	5.37 (1.17)	5.27 (1.16)	6.15 (1.01)	6.08 (1.03)
4. Average age	14.9–17.2	15.67 (0.29)	15.72 (0.29)	15.61 (0.32)	15.64 (0.34)	15.24 (0.38)	15.28 (0.27)
5. School size	3–164.5	47.08 (33.75)	50.17 (40.07)	37.28 (22.13)	48.64 (35.90)	133.67 (203.83)	54.29 (46.26)
6. Proportion of female	0–0.84	0.49 (0.12)	0.46 (0.12)	0.49 (0.11)	0.45 (0.11)	0.52 (0.09)	0.48 (0.12)
7. Poverty rate	0.02–0.48	0.14 (0.12)	0.14 (0.07)	0.14 (0.06)	0.13 (0.06)	0.14 (0.09)	0.12 (0.06)
8. Proportion of senior education parent	0–1	0.14 (0.16)	0.17 (0.21)	0.25 (0.26)	0.27 (0.23)	0.65 (0.56)	0.50 (0.40)
9. Proportion of professional parent	0–1	0.03 (0.09)	0.04 (0.11)	0.05 (0.10)	0.06 (0.09)	0.41 (0.42)	0.15 (0.17)
10. Average number of school	1–47	5.47 (7.92)	3.93 (5.32)	2.95 (3.42)	3.58 (4.30)	1.00 (0.00)	1.80 (1.57)
11. Java versus non-Java	0–1	0.81 (0.39)	0.87 (0.34)	0.50 (0.50)	0.61 (0.49)	0.670 (0.58)	0.59 (0.49)

Parental occupation. Six categories are distinguished: "1" for farmer/worker (36.0%), "2" for civil servant/professional (5.3%), "3" for private worker (12.0%), "4" for self-employed (17.5%), and "5" for other (6.2%). If parent's occupation was unknown, it was coded "0".

School

Size: number of students. School size ranges from 3 to 476, with an average of 53. There is one school with only three students. Schools located in remote areas may be allowed to have low student numbers in order to also reach children in areas that are difficult to access. Such schools are called "mini-schools", and they usually have only one teacher who also acts as its principal.

School size category. Based on the MoEC standard of class and school, five categories are distinguished: "1" for <20; "2" for =>20 and <36; "3" for >36 and <108; "4" for =>108 and =<325; "5" for >325.

Average age. Average age is computed as the mean student age, ranging from 14 to 18.9.

Proportion of female students. The proportion of female students ranges from 0 to 0.84, where a percentage equal to 0, that is, the absence of girls in the school, reflects a single-sex (boys) school.

Proportion of well-educated parents. The proportion of well-educated parents is computed as the number of parents with senior secondary and higher education (summing Categories "3" and "4").

Proportion of parents with high-status jobs. The proportion of parents with high-status jobs is computed as the number of parents who are civil servants or have a professional job like lawyer or doctor (Category "2").

Municipality

Poverty rate. The poverty rate is calculated from the national socioeconomic survey (Central Bureau of Statistics of Indonesia, 2010), ranging from 2.48% with an average of 13.3%.

Location. Location is a categorical variable, distinguishing municipalities on Java Island versus non-Java municipalities.

Average school size. The average school size is the mean over all schools in the municipality, ranging from 3 to 164.5.

Mean school proportion of female students. The mean school proportion of female students is the mean over all schools in the municipality, ranging from 0 to 0.84.

Mean school proportion of well-educated parents. The mean school proportion of well-educated parents ranges from 0 to 1, with an average of 27.8%.

Mean school proportion of parents with high-status jobs. The mean school proportion of parents with high-status jobs ranges from 0 to 1, with an average of 24.9%.

Analytical strategy

As a preparatory step to a multivariate analysis, bivariate association measures were computed at the three levels. The hypotheses set forth in the previous sections were investigated using multilevel analysis (see, e.g., Snijders & Bosker, 2012), performed in MlwiN (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). Multilevel analysis is appropriate because it takes into account the inherent dependent nature of scores of students in the same classroom or school, in the same region, allowing proper testing of the hypotheses formulated at the student, school, and municipality levels.

For each of the three National Exam subject scores, in math, science, and English, a model is built in four steps, using a forward selection strategy to take into account more potential confounders. The first model contains student-level variables, that is, age and parental-SES characteristics education and occupation. In the second step, school-level variables, that is, school type as characterized by stream and track, school size, and aggregated SES variables, are added, followed by district-level characteristics, that is, poverty rate and aggregated SES variables expressed as percentage of well-educated parents and percentage of parents working as professionals (including civil servants), in the third step.

To investigate whether the model parameters are constant across school type and to test Hypotheses 3 and 4, within-level and cross-level interactions are added in a final step of which significant effects are retained.

Results

The exam scores of modernist madrasahs and schools are the lowest at student, school, and municipality levels. These schools are, more than the other streams, located outside Java. Parental education and job status is highest in integrationist institutes, and in the traditionalist and modernist non-madrasah schools somewhat higher than in the same-stream madrasahs, also at all three levels. Pupils in madrasahs have higher test scores in the traditionalist and modernist streams and in all subjects. School and municipality average exam score differences between madrasahs and non-madrasahs are similar for the modernist streams, whereas the average school score differences in the traditionalist stream almost vanish but the average municipality score differences increase. The uneven distribution of madrasahs and schools across the three streams will be taken into account when interpreting the results of the analyses.

Correlations revealed that the three NE scores are highly correlated at all levels, with the strongest association between math and science. Most correlations are in the expected direction, but rather low, as shown in Table 2.

Overall, the correlations for all subjects at the school and municipality levels are about equal and higher than those correlations at the student level. This confirms that it is important to distinguish effects of explanatory factors at all levels in the multilevel modeling as laid out in the analytical strategy.

Table 2. Correlations for student-, school-, and municipality-level variables.

Variables		1	2	3	4	5	6	7
		Student (N = 156,952)						
1. Math score and its average			.677**	.596**	−.107**	.036**	.076**	.056**
2. Science score and its average		.895**		.575**	−.105**	.027**	.079**	.050**
3. English score and its average		.828**	.817**		−.139**	.087**	.120**	.068**
4. Student age and its average		−.150**	−.155**	−.213**		−.124**	−.118**	−.055**
5. Student gender (1 = girl & proportion of girl)		.047**	.042*	.059**	−.169**		−.018**	−.009**
6. Parent education (1 = senior/higher & its proportion)	School (N = 3,150)	.045*	.051**	.112**	−.235**	−.059**		.284**
7. Parent job (1 = professional & its proportion)		.073**	.093**	.122**	−.167**	−.035*	.548**	
8. School size (continuos)		−.048**	−.057**	−,022	−.208**	.082**	.123**	.146**
Municipality-level variables (N = 366)		1	2	3	4	5	6	7
1. Math score average		1						
2. Science score average		.878**	1					
3. English score average		.842**	.805**	1				
4. Municipality poverty rate		.122*	.090	.046	1			
5. Student age, average		−.181**	−.162**	−.222**	.130*	1		
6. Proportion of females		.051	.060	.065	−.014	−.225**	1	
7. Proportion of senior/higher education parents		−.063	−.045	.004	−.176**	−.285**	−.026	1
8. Proportion of professional parents		−.022	.003	−.015	.039	−.174**	.066	.553**

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Multilevel analysis

We started our analysis by estimating a null model with the intercept variances at the student, school, and municipality levels. The intercept-only model from the null model estimates the intercept as 5.58, 5.76, and 5.43, which are simply the weighted average scores for mathematics, science, and English across students, schools, and municipalities and (almost) equal to the means. The variances of the student-, school-, and municipality-level residual errors for all subjects are highest at the individual level with 1.96 for math, 1.54 for science, and 1.50 for English. The lowest variances at the school level are 1.08, 0.74, and 0.61, respectively. Calculated from the school variance divided by the total variance, that is, the sum of the student, school, and municipality variances, the intra-class correlation (ICC) at the school level equals 0.32 for mathematics, 0.32 for science, and 0.28 for English. These numbers can be considered substantial, and an extra justification for using multilevel analysis. In the final model, the total variance is only slightly reduced, which implies that, although the variables included in the model significantly contribute to explaining the variance, the total explained variance is low.

Table 3 displays the estimation results for the four different specifications of the educational production function: Model 1 includes only the student-level variables: age, gender, parental education, and occupation. Model 2 additionally includes the school-level variables: track, stream, proportion of students from at least a senior educational background, proportion of parents in a professional occupation, and school size categorization. Model 3 takes into account the municipality-level characteristics: poverty rates, proportion of students from at least a senior educational background, and proportion of parents in a professional occupation. Finally, Model 4 also includes the cross-level interactions between the student- and school-level factors, and between the municipality- and school-level factors.

Table 3. Multilevel analyses of student achievements including student- and school-level factors ($N_{level1} = 156{,}952$; $N_{level2} = 3{,}150$; $N_{level3} = 366$).

	Model 1									Model 2								
	Math			Science			English			Math			Science			English		
Variables	β	*SE*		β	*SE*		β	*SE*		β	*SE*		β	*SE*		β	*SE*	
Fixed Part																		
Intercepts	5.510	0.071		5.703	0.061		5.268	0.054		5.944	0.112		6.097	0.095		5.889	0.084	
Student-level variables																		
Age	−0.136	0.004	***	−0.121	0.004	***	−0.139	0.004	***	−0.136	0.004	***	−0.120	0.004	***	−0.139	0.004	***
Gender: Boy *(ref.)*																		
– Girl	0.108	0.007	***	0.065	0.006	***	0.259	0.006	***	0.108	0.007	***	0.065	0.006	***	0.259	0.006	***
Parents' education: Junior & below *(ref.)*																		
– Senior/higher education	0.101	0.011	***	0.112	0.010	***	0.184	0.010	***	0.101	0.011	***	0.112	0.010	***	0.182	0.010	***
Parents' occupation: Non-professional *(ref.)*																		
– Professional	0.138	0.018	***	0.084	0.016	***	0.134	0.016	***	0.137	0.018	***	0.083	0.016	***	0.132	0.016	***
School-level variables																		
Track: Non-madrasah *(ref.)*																		
– Madrasah										0.278	0.046	***	0.238	0.038	***	0.227	0.034	***
Stream: Integrationist *(ref.)*																		
– Traditionalist										−0.486	0.104	***	−0.454	0.086	***	−0.715	0.077	***
– Modernist										−0.639	0.097	***	−0.565	0.080	***	−0.799	0.072	***
Random Part																		
– Municipality level	1.445	0.134		1.089	0.100		0.817	0.076		1.454	0.134		1.098	0.100		0.841	0.077	
– School level	1.068	0.030		0.729	0.021		0.593	0.017		1.030	0.029		0.702	0.020		0.556	0.016	
– Student level	1.938	0.007		1.526	0.006		1.465	0.005		1.938	0.007		1.526	0.006		1.465	0.005	
*−2*loglikelihood:*	559,538			521,682			514,785			559,445			521,586			514,627		

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

From Model 1 in Table 3, it becomes clear that female students have significantly higher scores than male students in all subjects. The largest score differences between girls and boys are in English by 0.3 points, and the smallest difference is in science by 0.1 points. Similarly, children of higher educated parents and professional parents have significantly higher scores, leading to a difference of about 0.2 points and 0.1 points, respectively. However, scores for all subjects decrease as students become older. These results are stable after taking into account the variables at the school level (Model 2), the municipality level (Model 3), and the within- and between-level interactions (Model 4) in Table 4.

The first hypothesis predicts that *students who attend private madrasahs attain a lower level of achievement than students who attend private non-madrasahs.* Results provide evidence contradictory to our expectation. Data show that children attending madrasahs perform better than their non-madrasah counterparts. The findings in Model 2 in Table 3 reveal that scores of students attending private non-madrasahs generally have significantly *lower* scores in math, science, and English compared to those enrolled in private madrasahs, by 0.3, 0.2, and 0.2 points, respectively.

These findings are quite stable, as shown in Model 3 and Model 4. For instance, after controlling for municipality factors (Model 3) and adding interaction effects (Model 4), the effects of attending madrasahs remain similar. Moreover, in madrasahs, girls perform better in science than boys, whereas children of well-educated parents perform slightly less well in English compared to children of parents with lower education (see Table 4).

Interestingly, whereas in municipalities with a higher poverty rate, student performance in non-madrasahs is higher in math and science, in madrasahs this effect is absent in science and less strong in math. Student achievement in English in municipalities with a higher poverty rate is higher in traditionalist and modernist madrasahs and non-madrasahs, and lower in integrationist madrasahs (compared to integrationist non-madrasahs). Municipalities with a large number of schools have higher math and English student performance.

The second hypothesis assumes that *students in the integrationist stream attain higher academic achievement than those in modernist and traditionalist streams*. In general, our findings are in line with the hypothesis that the scores of students in the integrationist stream are higher than those of their peers in modernist and traditionalist streams in all subjects, where the differences between the streams depend on student's gender and municipality location and poverty. Consequently, the results partially support Hypothesis 2. The results also reveal a complex interplay between individual-, school-, and municipality-level factors that we need to bear in mind when testing the hypotheses and interpreting the model parameters.

Taking into account the cross-level interactions: (1) between school types and student characteristics and (2) between school types and municipality factors, a difference in English student achievement is found only between the modernist stream and the integrationist stream. Although girls perform better in all subjects than boys, their achievement is somewhat lower in traditionalist and modernist schools compared to integrationist schools.

Note that by carefully investigating the first two hypotheses, the third hypothesis reading *gender-based achievement gaps in private madrasahs are greater than in private non-madrasahs (H3a)* and *gender-based achievement gaps in the integrationist stream are*

Table 4. Multilevel analyses of student achievements including student-, school-, and municipality-level factors and their interactions (*N_{level1} = 156,952; N_{level2} = 3,150; N_{level3} = 366)*.

	Model 3									Model 4								
	Math			Science			English			Math			Science			English		
	β	*SE*		β	*SE*		β	*SE*		β	*SE*		β	*SE*		β	*SE*	
Intercepts	6.419	0.189		6.540	0.163		5.948	0.096		5.791	0.216		6.044	0.185		5.479	0.131	
Student-level variables																		
Age	−0.136	0.004	***	−0.120	0.004	***	−0.139	0.004	***	−0.136	0.004	***	−0.121	0.004	***	−0.139	0.004	***
Gender: Boy *(ref.)*																		
Girl	0.108	0.007	***	0.065	0.006	***	0.259	0.006	***	0.389	0.030	***	0.238	0.027	***	0.359	0.026	***
Parents' education: Junior & below *(ref.)*																		
Senior/higher education	0.101	0.011	***	0.113	0.010	***	0.183	0.010	***	0.101	0.011	***	0.112	0.010	***	0.208	0.012	***
Parents' occupation: Non-professional *(ref.)*																		
Professional	0.137	0.018	***	0.083	0.016	***	0.132	0.016	***	0.138	0.018	***	0.084	0.016	***	0.133	0.016	***
School-level variables																		
Track: Non-madrasah *(ref.)*																		
Madrasah	0.269	0.046	***	0.231	0.038	***	0.223	0.034	***	0.267	0.046	***	0.202	0.039	***	0.243	0.035	***
Stream: Integrationist *(ref.)*																		
Traditionalist	−0.507	0.104	***	−0.472	0.087	***	−0.727	0.078	***	0.209	0.174		0.154	0.145		−0.146	0.134	
Modernist	−0.671	0.097	***	−0.589	0.081	***	−0.813	0.072	***	0.014	0.154		−0.058	0.128		−0.344	0.121	**
Municipality-level variables																		
Poverty rate	2.179	1.082	*	1.319	0.934		0.625	0.835		2.944	1.134	**	2.434	0.983	**	−1.930	1.519	
Parents with senior education	−0.393	0.322		−0.365	0.278		−0.247	0.249		−0.364	0.322		−0.170	0.287		−0.197	0.248	
Number of schools	0.010	0.006		0.012	0.005	**	0.006	0.004		0.009	0.006		0.011	0.005	*	0.007	0.004	
Region: Non-Java *(ref.)*																		
Java	−0.622	0.166	***	−0.475	0.144	***	−0.271	0.129	*	0.212	0.240		0.208	0.204		0.215	0.183	
Cross-level interaction effects																		
School and student level																		
Madrasah x Girl													0.047	0.015	***			
Madrasa x well-educated parent																−0.068	0.019	***
Traditionalist x Girl										−0.316	0.032	***	−0.222	0.030	***	−0.103	0.028	***
Modernist x Girl										−0.282	0.032	***	−0.190	0.028	***	−0.111	0.028	***

(*Continued*)

Table 4. Continued.

	Model 3						Model 4								
	Math		Science		English		Math			Science			English		
	β	*SE*	β	*SE*	β	*SE*	β	*SE*		β	*SE*		β	*SE*	
Municipality and school level															
Municipality poverty rate x Madrasah							−1.580	0.819		−2.358	0.741	***	−1.313	0.639	*
Municipality poverty rate x Traditionalist													3.548	1.491	**
Municipality poverty rate x Modernist													3.320	1.361	**
Proportion of well-educated parents x Madrasah										−0.510	0.234	**			
School number at municipality x Madrasah							0.003	0.001	**	0.003	0.001	**			
Java x Traditionalist							−0.920	0.210	***	−0.818	0.175	***	−0.653	0.158	***
Java x Modernist							−0.924	0.195	***	−0.730	0.162	***	−0.507	0.147	***
Random Part															
Municipality level	1.348	0.126	1.031	0.095	0.821	0.076	1.348	0.126		1.027	0.094		0.810	0.075	
School level	1.030	0.029	0.702	0.020	0.556	0.016	1.019	0.029		0.693	0.020		0.550	0.016	
Student level	1.938	0.007	1.526	0.006	1.465	0.005	1.936	0.007		1.526	0.006		1.465	0.005	
*−2*loglikelihood:*	*559,423*		*521,568*		*514,619*		*559,295*			*521,474*			*514,561*		

*$p < 0.05$. **$p < 0.01$. ***$p < 0.00$.

greater than those in traditionalist and modernist streams (H3b) has been addressed and mostly supported.

Figure 3 shows that the gender achievement gap in private madrasahs is higher than in private non-madrasah counterparts in science, but there are no differences for math and English. This finding thus partially supports Hypothesis 3a. Figure 3 also reveals that for all subjects, the gender achievement gap in the integrationist stream is larger than the gap in the traditionalist and modernist streams, which supports Hypothesis 3b.

The difference in student performance between the traditionalist and modernist streams and the integrationist stream is greater on Java (in favor of integrationist schools) compared to schools in other regions.

The final hypothesis postulates that *the SES achievement gap in private madrasahs is greater than in private non-madrasahs (H4a) and the SES achievement gap in integrationist schools is greater than those gaps in both traditionalist and modernist schools (H4b)*. The results fully refute this set of hypotheses as represented in Model 4 in Table 3 and Figure 3.

Model 4 in Table 4 illustrates that the effects of SES as represented by parental education and occupation are significantly positive for all subjects with differences between the groups ranging from 0.1 to 0.3 on average. Enrolling in private madrasahs significantly reduces the advantage of students from well-educated parents over those from low-educated parents. Thus, the SES achievement gaps in private madrasahs are smaller than in private non-madrasahs, as shown in Figure 4, which is contradictory to our hypothesis (H4a).

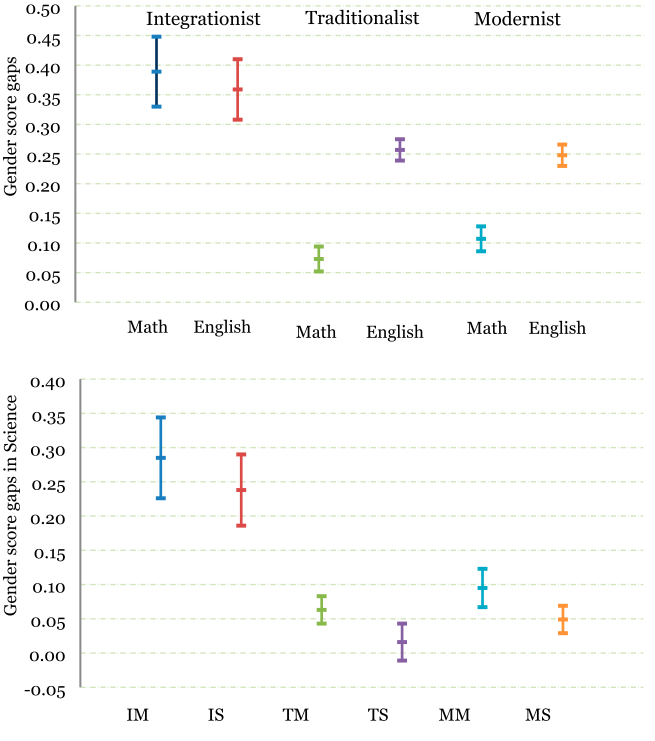

Figure 3. Gender achievement gaps across tracks and streams.

Notes: IM = integrationist madrasah; IS = integrationist school/non-madrasah; TM = traditionalist madrasah; TS = traditionalist school; MM = modernist madrasah; MS = modernist school.

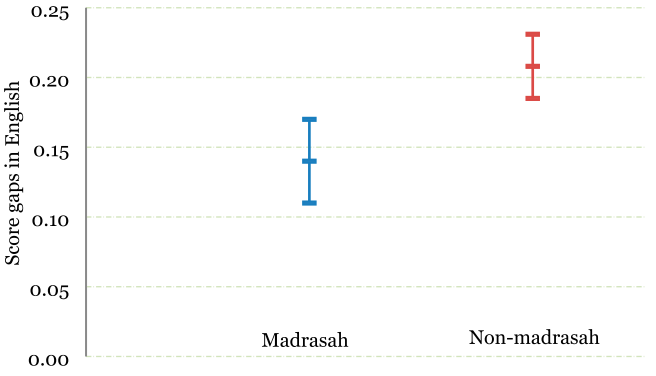

Figure 4. Parental education (SES) achievement gaps across tracks.
Note: Figures are based on Model 4 in Table 3.

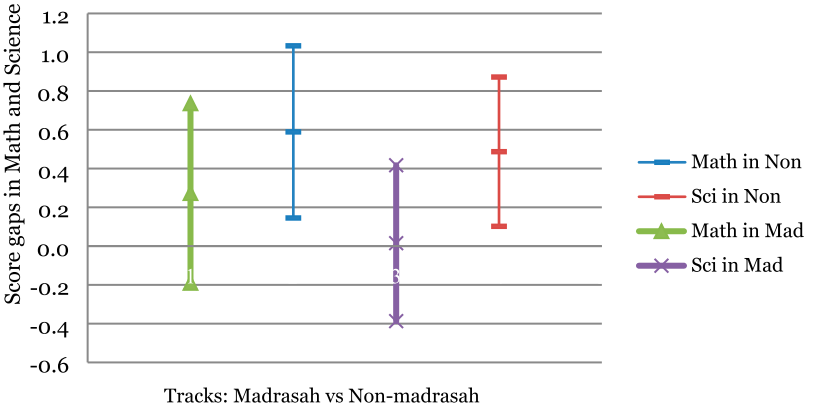

Figure 5. Poverty achievement gap of 20% for math and science across tracks.
Note: Figures are based on Model 4 in Table 3.

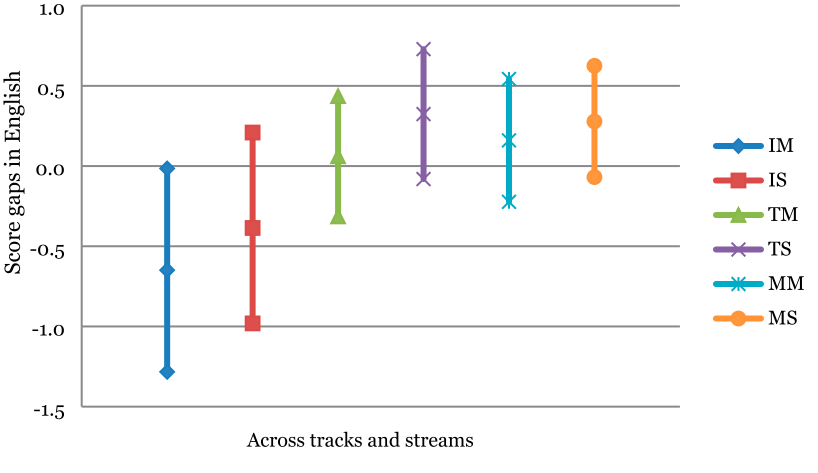

Figure 6. Poverty achievement gap of 20% in English across tracks and streams.
Notes: IM = integrationist madrasah; IS = integrationist school/non-madrasah; TM = traditionalist madrasah; TS = traditionalist school; MM = modernist madrasah; MS = modernist school. Figures are based on Model 4 in Table 3.

Table 5. Mean observed and estimated scores of the main variables.

Mean scores		Traditionalist		Modernist		Integrationist	
		Madrasah	School	Madrasah	School	Madrasah	School
1. Math	Observed	5.74	5.66	5.39	5.28	6.34	6.26
	Estimated	5.74	5.46	5.88	5.64	5.40	5.17
2. Science	Observed	5.95	5.93	5.67	5.53	6.20	6.31
	Estimated	5.58	5.31	5.77	5.53	5.32	5.09
3. English	Observed	5.52	5.46	5.31	5.28	6.39	6.36
	Estimated	6.22	5.94	6.34	6.10	6.12	5.89

Figures 5 and 6 reveal that that there are no cross-level interactions between parental SES and school streams, implying that there are no differences in SES achievement gaps between students in integrationist streams and their other counterparts for all subjects, which contradicts our hypothesis (H4b).

We compared the mean scores of the descriptive and multilevel results to check their consistency. Table 5 shows that the results are slightly different due to the control variables, such as age, gender, parental education, and occupation.

Discussion and conclusion

In this study, we assessed the effects of various organizational (tracks) and ideological (streams) in Indonesian private Islamic schools on students' academic achievement and achievement gaps across gender and parental SES. The results of the multilevel analyses suggest that investments in teaching time, more qualified teachers, and financial incentives may be among the factors associated with higher student performance, thereby echoing findings from educational studies outside Indonesia (Darling-Hammond, 2000; Grave, 2010; Hanushek, 2006; Stinebrickner & Stinebrickner, 2008). In addition, findings prove that gender achievement gaps in the integrationist stream are higher than in other streams for all subjects. For science, the gender achievement gap in private madrasahs is higher than in private non-madrasahs. This does not hold for math and English. This implies that investment decisions indeed matter, but that their effects are largely contingent upon student characteristics and the type of school that makes the investment.

This study also resulted in some contradictive findings, for which we will offer some tentative explanations. In terms of organizational perspective (track), we predicted, in agreement with general perceptions on madrasahs and resource investments, that student achievement in madrasahs is lower than in non-madrasahs, but we found contradictive evidence for this. This contradictive finding is not easy to interpret. Perhaps it can be explained by the selection of the proxy variables at the student level that could not fully assess prior student achievement. It may be that students in madrasah schools are overall better students than students in non-madrasah schools. Although in the present study, we were unable to control for prior student achievement, the data showed that the effects of parental education and occupation on student achievement are lower in non-madrasah than in madrasah schools, which compensates for the imbalance in parental education and occupation in these tracks. As a result, the overall student achievement in madrasah schools is better.

A second contradictive finding is that the SES achievement gap for English in private madrasahs is smaller than in private non-madrasahs. This unexpected finding is difficult

to interpret. We previously assumed that decentralization only benefited non-madrasahs and not madrasahs. This could be true for public non-madrasahs, which are directly managed by the local government, but not for private non-madrasahs, which are owned by non-government organizations. A previous study by Ghozali et al. (2013) showed that local governments (a) do not treat private non-madrasahs equally as independent institutions and (b) provide scholarships and school grants for both non-madrasahs and madrasahs to reduce political risk in direct elections. The smaller gap found only for English in private madrasahs could be related to effects of parental education and occupation. Student achievement in traditionalist and modernist streams in all subjects is lower on the island of Java than in other regions of the Indonesian archipelago. This finding is related to the context in that public schools – which perform better than private schools – are mostly available in Java Island. This means that parents have the option to send children whose primary school exam scores are sufficient to public junior secondary schools. As a result, private secondary schools mostly accepted children with insufficient exam scores. In addition, compared to non-Java areas, traditionalist and modernist schools in Java served more underprivileged students in rural areas. Moreover, compared to learning math and science, learning English can also be influenced by learning outside school, such as attending extra language courses or having media access to English materials. High-SES parents have more possible access to English courses and to resources like multimedia, especially on Java.

The expected better performance of students in integrationist streams compared to their traditionalist and modernist counterparts was found to be highly dependent on gender and municipality. Female students have a pronounced advantage in integrationist schools, which are characterized by single-sex education. This may be in line with findings from other studies showing single-sex education to minimize distractions, reduce discipline problems, and boost the self-esteem and confidence of girls, thus leading to high performance (Bracey, 2006; Gurian & Henley, 2001; Marsh et al., 1999; Piper, 2008).

The study also revealed an unexpected finding. No differences were found between the integrationist stream and the two other streams with regard to SES achievement gaps. This implies that ideological views which are operationalized by financial or other support for low-SES pupils in traditionalist and modernist streams do not appear to help to narrow the SES achievement gap. Perhaps the financial and other support for students from families with low SES increase their daily attendance. The resultant improvement is too small to adequately reduce the SES achievement gap.

As noted before, in terms of organization (track), the role of municipalities became very important after the implementation of a decentralized education system. Even though the effects of municipality poverty rates differ across subjects, these effects are significant, with similar patterns for math and science, which differ from English. To facilitate interpretation, we calculated the effects of a municipality poverty rate gap of 20%. For math and science, Figure 5 reveals that the student achievement gap is lower in madrasahs than in non-madrasahs. For English, Figure 6 shows that the gap is smaller in the integrationist stream than in the traditionalist and modernist streams.

The finding also shows that, after including the school-level variables, the proportion of variance at the school level (ICC) slightly decreases by 2% for mathematics, science, and English. These modest explained variances imply that the effects of school stream and track are smaller than the effects of individual student variables. Parents' SES remains a

key predictor of student achievement. This finding suggests that government efforts to reduce the achievement gap should focus on supporting students from low-income and educational backgrounds, for example, by providing scholarships and improve access to good schools.

In sum, the findings in this study confirm the value of the education production function approach and reveal the importance of municipality factors. Before discussing the implications of our findings, however, we acknowledge some limitations of this study.

First, the modest degree of explained variance at all levels might be partly due to our use of aggregate variables at the school level. The results revealed important significant effects at the student level, such as age and gender. It implies that affirmative government interventions, such as providing scholarships to individual students, are crucial to equalize student achievement and reduce the achievement gap, particularly for students from poorer and less well-educated families. Meanwhile, in view of the substantial variability at the municipality level, it would be worthwhile to include more variables related to municipality, like subdistrict and village characteristics. The development of more fine-grained variables and measurements may help to unravel the mechanisms underlying the relation between private Islamic school types and student achievement and achievement gaps.

Second, in spite of the consistency with our theoretical reasoning, in the study we used cross-sectional data that impede causal inferences. Further studies, therefore, would profit from a longitudinal design to disentangle causality relations between resource investment and student achievement. Moreover, such a design could account for the effect of prior student achievement.

Apart from these limitations, our study has several general implications for research and policy. It refines current research on student achievement and achievement gaps in three ways. *First*, our study provides insights into strengths and weaknesses across school tracks and streams. Such insights can enable local governments to develop better and more equal interventions to improve education in Islamic private madrasahs and non-madrasahs, both in the domains of school funding and teacher development. The patterns seem to indicate that the government's interventions to improve Islamic private schools need to be focused on the traditionalist and modernist streams. Both streams predominantly serve children from low-SES parents, and are thus associated with limited parental resources, leading in turn to inadequate school incomes. In addition, the presence of modernist schools in all provinces and almost all municipalities indicates that they reach diverse students across the country, including remote areas where public schools do not exist. Therefore, improving the quality of modernist and traditionalist schools would lead to improved quality of learning for underprivileged and underserved students.

Second, our study suggests that although school tracks and streams matter, student and family characteristics are still strong determinants of student achievement and achievement gaps. Examination of the cross-level interaction between gender and school streams shows that the effects of school streams are only significant for girls in the integrationist stream, implying that differences across streams affect girls and boys differently. This result provides new insight into the conditions under which students perform better in the Islamic private school. For instance, girls seem to profit from the implementation of single-sex education in private Islamic schools but boys do not have those benefits.

Third, to our knowledge, this study is the first empirical attempt to test the relation between characteristics of private Islamic school tracks and streams and student

achievement and achievement gaps in Indonesia, one of the largest Muslim-majority countries in the world. Most research in student achievement and achievement gaps has been conducted in schools in general (Suharti, 2013; Suryadarma, 2010) or compared public and private schools (Newhouse & Beegle, 2006). This study, therefore, fills a gap to enrich the literature on the education production function approach by adding information about organizational and resource investments in the specific context of private Islamic school tracks and streams. Although this study allowed for investigating the education production function approach by adding information about organizational and resource investments in the specific context of private Islamic school tracks and streams, our cross-sectional research design did not allow us to assess the causal effect of school tracks and streams on student achievement and the achievement gap. Future research in other Muslim-majority countries could investigate in more detail how organizations invest their resources into their established day-to-day learning, an issue that has received limited attention in current empirical studies.

Notes

1. Data available at http://www.muhammadiyah.or.id/content-8-det-amal-usaha.html
2. Available at http://www.maarif-nu.or.id/Profil.aspx
3. Available at https://www.tvmadrasah.com/2019-01-19/ada-apa-dengan-sekolah-islam-terpadu

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